

WHAT IS CLAIMED IS:

1. A Wavelength division multiplexing-passive optical network that enables the integration of broadcast and communication data, the network comprising:

an optical line terminal) to (1) receive a digital broadcasting signal from a
5 broadcasting network and first communication signal from an internet protocol network,
and (2) transmitting the received broadcast and the first communication signal as a single
integrated optical signal;

an optical network terminal/optical network unit) as a user-side device for
transferring (1) the integrated optical signal, from the optical line terminal, to a service user,

10 and (2) user data from the service user to the optical line terminal;

a first WDM demultiplexer for WDM-demultiplexing the single
broadcast/communication-integrated optical signal from the optical line terminal, and
transferring it to the optical network terminal/optical network unit; and

a first WDM multiplexer for WDM-multiplexing the user data from the optical
15 network terminal/optical network unit and transferring it to the optical line terminal.

2. The network as set forth in claim 1, wherein optical line terminal is further
enabled to transfer a second communication signal, received from a service user, to the IP
network.

3. The network as set forth in claim 2, wherein optical line terminal further includes a photoelectric converter used to produce the integrated optical signal.

4. The network as set forth in claim 2, wherein user data includes channel-information data of a digital broadcast desired by the service user and the second communication signal.

5. The network as set forth in claim 4, wherein the optical line terminal further includes:

a broadcast switch for switching digital broadcast data from the broadcasting network;

5 a broadcast channel controller for selecting a broadcast channel desired by the service user by controlling the broadcast switch according to broadcast channel request information of a service user included in the user data;

a first Ethernet switch for switching each of the first and second communication signal so as to transmit the second communication signal included in the user data to the
10 Internet protocol network, or to transmit the first communication signal to the optical network terminal/optical network unit;

a communication/broadcast multiplexer for multiplexing the first communication signal and the digital broadcast signal;

a second Ethernet switch for separating the user data received from the service user
15 into the channel-information data of a digital broadcast desired by the service user and the

second communication signal from the service user;

a first optical transmitter for optically modulating communication/broadcast data, multiplexed through the communication/broadcast multiplexer, by its electro-optical conversion;

5 a second WDM multiplexer for multiplexing wavelength-by-wavelength signals, optically modulated through the first optical transmitter, and transferring them as the single integrated optical signal;

a second WDM demultiplexer for separating optical signals, transmitted from the optical network terminal/optical network unit, according to their wavelength; and

10 a first optical receiver for photoelectrically converting the optical signals separated according to their wavelength through the second WDM demultiplexer.

6. The network as set forth in claim 4, the optical network terminal/optical network unit including:

a second optical receiver for receiving the single broadcast/communication-
15 integrated optical signal transmitted from the optical line terminal through the first WDM demultiplexer, and photoelectrically converting the received signal;

a communication/broadcast demultiplexer for separating the single integrated optical signal, received through the second optical receiver, into the first communication signal and the digital broadcast signal;

20 a hub switch for forming the user data by joining together the digital broadcast selection data for selecting the digital broadcast channel desired by the service user and the

communication data provided from the service user to the Internet protocol network; and

a second optical transmitter for electro-optically converting the user data, joined together through the hub switch, to be optically modulated, and transmitting it to the first WDM multiplexer for the purpose of transmitting it to the optical line terminal.

5 7. The network as set forth in claim 4, wherein a single wavelength for optical transmission between the OLT and the optical network terminal/optical network unit is assigned to each service user.

8. The network as set forth in claim 4, wherein the optical line terminal further includes an optical amplifier for optically-modulating and amplifying an analog broadcast
10 signal, and an optical coupler for combining the analog broadcast signal with the single broadcast/communication-integrated optical signal, so as to receive and transmit the analog broadcast signal,

the network further comprising:

an optical splitter for separating an optical signal, combined with the analog
15 broadcast signal, from the optical line terminal into the analog broadcast signal and the single integrated optical signal, and transmitting the separated signals;

a photoelectric converter for photoelectrically converting the analog broadcast signal separated through the optical splitter; and

a radio frequency) splitter for distributing the photoelectrically-converted electrical
20 analog broadcast signal to the optical network terminal/optical network unit.

9. A wavelength division multiplexing-passive optical network that enables the integration of broadcast and communication data, the network comprising:

an optical line terminal to (1) receive a digital broadcasting signal from broadcasting network and a first communication signal from an Internet protocol network,
5 and (2) transmitting the received broadcast and the first communication signals as a single integrated optical signal;

an optical network terminal/optical network unit as a user-side device for transferring (1) the single integrated optical signal, from the optical line terminal, to a service user, and (2) user data from the service user to the optical line terminal using an
10 optical signal having a wavelength different from the integrated optical signal; and

a first WDM multiplexer/demultiplexer for (1) receiving and WDM-demultiplexing the single integrated optical signal from the optical line terminal, (2) transferring the integrated optical signal to the optical network terminal/optical network unit, (3) WDM-multiplexing the user data from the optical network terminal/optical network unit, and (4)
15 transferring the user data to the optical line terminal.

10. The network as set forth in claim 9, wherein optical line terminal is further enabled to transfer a second communication signal, received from a service user, to the IP network.

11. The network as set forth in claim 10, wherein optical line terminal further includes a photoelectric converter used to produce the integrated optical signal.

12. The network as set forth in claim 10, wherein user data includes channel-information data of a digital broadcast desired by the service user and the second communication signal.

13. The network as set forth in claim 12, the optical line terminal including:

a broadcast switch for switching digital broadcast data from the broadcasting network;

5 a broadcast channel controller for selecting a broadcast channel desired by the service user by controlling the broadcast switch according to broadcast channel request information of a service user included in the user data;

a first Ethernet switch for switching each of the first and second communication data so as to transmit the second communication data included in the user data to the IP network, or to transmit the first communication data to the optical network terminal/optical
10 network unit;

a communication/broadcast multiplexer for multiplexing the first communication data and the digital broadcast data;

a second Ethernet switch for separating the user data received from the service user into the channel-information data of a digital broadcast desired by the service user and the
15 second communication data from the service user;

a first optical transmitter for optically modulating communication/broadcast data, multiplexed through the communication/broadcast multiplexer, by its electro-optical conversion;

a second WDM multiplexer/demultiplexer for multiplexing wavelength-by-wavelength signals, optically modulated through the first optical transmitter, and transferring them as the single integrated optical signal, and further separating optical signals, transmitted from the optical network terminal/optical network unit, according to their wavelength; and

a first optical receiver for photoelectrically converting the optical signals separated according to their wavelength through the second WDM multiplexer/demultiplexer.

14. The network as set forth in claim 12, the optical network terminal/optical network unit including:

a second optical receiver for receiving the single broadcast/communication-integrated optical signal, demultiplexed through the first WDM multiplexer/demultiplexer and transmitted from the optical line terminal, and photoelectrically converting the received signal;

a communication/broadcast demultiplexer for separating the single integrated optical signal, received through the second optical receiver, into the first communication signal and the digital broadcast signal;

a hub switch for forming the user data by joining together the digital broadcast selection data for selecting the digital broadcast channel desired by the service user and the

communication data provided from the service user to the IP network; and

a second optical transmitter for electro-optically converting the user data, joined together through the hub switch, to be optically modulated, and transmitting it to the first WDM multiplexer/multiplexer for the purpose of transmitting it to the optical line terminal.

5 15. The network as set forth in claim 12, wherein the optical line terminal further includes an optical amplifier for optically-modulating and amplifying an analog broadcast signal, and an optical coupler for combining the analog broadcast signal with the single integrated optical signal, so as to receive and transmit the analog broadcast signal,

the WDM-PON further comprising:

10 an optical splitter for separating an optical signal, combined with the analog broadcast signal, from the optical line terminal into the analog broadcast signal and the single broadcast/communication-integrated optical signal, and transmitting the separated signals;

15 a photoelectric converter for photoelectrically converting the analog broadcast signal separated through the optical splitter; and

a radio frequency) splitter for distributing the photoelectrically-converted electrical analog broadcast signal to the optical network terminal/optical network unit.